

**GAMING EQUIPMENT FOR TABLE GAMES  
USING PLAYING CARDS, IN PARTICULAR  
"BLACK JACK"**

The invention relates to gaming equipment for playing games of chance like "Black Jack" and other similar games in which playing cards are used.

**Preceding technical level**

Gaming equipment for table games is known in which playing cards are used, in particular for the game of "Black Jack" (see USA patent No.5735525 dated February 5, 1997, published April 7, 1998, Intern'l class A63F 1/18), including

- gaming table with cloth provided with markings designating sectors for the players and for the dealer, as well as areas for lacing playing cards face up,
- card shoe for storage and distribution playing cards drawn from it face down, equipped with the playing card imprint value recognition unit, the said cards are drawn from the card shoe,
- monitoring system of the game run, equipped with objects' presence on the table recognition unit.

The gaming table provided with markings, designating zones for the players, has betting boxes and other areas for placement of gaming chips (jettons). Objects' presence on the table recognition unit is created in the form of

- bet registration detectors, positioned in the betting boxes in the players' zones and other sections on which gaming chips can be placed, and also
- playing card registration detectors, positioned in the sections for placement of gaming cards face up.

Gaming equipment incorporates also control unit, connected to

- playing card imprint value recognition unit (said cards are drawn from the card shoe face down),

- bet registration detectors and
- playing card registration detectors, positioned on the sections for placement of the playing cards face up.

This known gaming equipment does not facilitate fast game run, does not provide possibility of exercising automatic control in real time over keeping the game rules at every stage of the game and over accuracy of the dealer's payments of wins to the players.

This results from the fact that bet registration detectors, which react to the object's presence on the table, positioned in the players zones, generate signals about bet presence in designated boxes and inform the control unit about the fact only that a player has placed a bet. However this known gaming equipment does not allow to obtain information about the bet size. Calculation of players wins and transfer of jettons between the dealer's bank and the players takes a lot of time. Game run slows down even more if a player places bets on other players places as well as on his/her place. To do this work correctly and quickly the dealer must be highly qualified and have good mathematical skills, however mistakes are common and manifest themselves after the shift end, when the dealer performs the bank count. Also the known gaming equipment does not allow to exercise automatic control over keeping the game rules at every stage of the game and over the accuracy of the dealer's payment of wins to the players.

Gaming equipment for table games is also known in which playing cards are used, in particular for the game of "Black Jack" (see USA patent No.5605334 dated April 11, 1995, published February 25, 1997, Intern'l class A63F 1/18), including

- gaming table with cloth provided with markings designating zones for the players and for the dealer, as well as areas for placing playing cards face up,
- card shoe for storage and distribution playing cards drawn from it face down, equipped with the playing card imprint value recognition unit, the said cards are drawn from the card shoe,
- the monitoring system of the game run, equipped with objects' presence on the table recognition unit.

The gaming table provided with markings, designating zones for the players, has betting boxes and other areas for placement of gaming chips

(jettons). Objects' presence on the table recognition unit is created in the form of

- bet registration detectors, positioned under the cloth in the betting boxes in the players' zones and other sections on which gaming chips can be placed, and also
- playing card registration detectors, positioned in the sections for placement of gaming cards face up.

Gaming equipment incorporates also control unit, connected to

- playing card imprint value recognition unit (said cards are drawn from the card shoe face down),
- bet registration detectors and
- playing card registration detectors, positioned on the sections for placement of the playing cards face up.

The control unit is provided with information storage system.

This known gaming equipment does not facilitate fast game run, does not provide possibility of exercising automatic control in real time over keeping the game rules at every stage of the game and over accuracy of the dealer's payments of wins to the players.

This results from the fact that bet registration detectors, which react to the objects' presence on the table, positioned in the players zones, generate signals about bet presence in designated boxes and inform the control unit about the fact only that a player has placed a bet. However this known gaming equipment does not allow to obtain information about the bet value. Calculation of players wins and transfer of jettons between the dealer's bank and the players takes a lot of time. Game run slows down even more if a player places bets on other players' places as well as on his/her place. To do this work correctly and quickly the dealer must be highly qualified and have good mathematical skills, however mistakes are common and manifest themselves after the shift end, when the dealer performs the bank count. Also the known gaming equipment does not allow to exercise automatic control over keeping the game rules and over the accuracy of the dealer's payment of wins to the players.

The closest in technical point and obtained result to the claimed invention is gaming equipment for table games in which playing cards are

used, in particular for the game of "Black Jack" (see German patent No.4439502 dated November 8, 1994, published September 14 1995, Intern'l class A63F 1/00), including

- gaming table with cloth provided with markings designating zones for the players and for the dealer, as well as areas for placing playing cards face up,
- card shoe for storage and distribution playing cards drawn from it face down, equipped with optical electronic sensor of playing cards movement and with the playing card imprint value recognition unit,
- the monitoring system of the game run, equipped with objects' presence on the table recognition unit,
- information storage system,
- computer, connected with the separate functional units by wire or wireless communications, supplied with the electronic data processing system, the said system programmed in accordance with the gaming rules,
- computer processed data visualisation device (the said data characterize the game run).

Which allows to evaluate signals coming

- on the first input from the output of the playing cards imprint value recognition unit (playing cards drawn from the card shoe face down),
- on the second input from the output of the objects' presence on the table recognition unit,
- the third input of the electronic data processing system is connected with the first output of the computer,
- the second output of the computer is connected with the input of the information storage system,
- the first output of the electronic data processing system is connected to the first input of the computer.

The gaming table provided with markings, designating zones for the players, has betting boxes and other areas for placement of gaming chips (jettons). Objects' presence on the table recognition unit, incorporated in the monitoring system of the game run, is created in the form of

- bet registration detectors, positioned under the cloth in the betting boxes in the players' zones and other sections on which gaming chips can be placed, and also
- playing card detectors, positioned in the sections for placement of gaming cards face up.

Monitoring system of the game run is supplied with bet detector for registration of the bets placed, the said bet detector functioning as automatic recognition unit. As the separate detectors composing the groups of detectors, registering the objects present on the table, light sensitive detectors are used, in particular infra-red sensitive photodiodes, e.g. silicon diodes. The separate light-sensitive detectors are placed in groups in such way that each object placed on the table in accordance with the gaming rules, a jetton or a playing card, covers at least two detectors. The bet detector, intended for automatic bet recognition, is a manual scanner, recognising the jetton's colour and the number of jettons of the same colour. The gaming bet detector may also be a high frequency identification system comprising a transmitter-receiver exchange connected with transponders built into jettons. Upon the supply of high-frequency signals to a transponder from the transmitter-receiver exchange the said transponder reverse signals to the station, the reversed signals characterize the jetton's value. Transponders include inductive antennas. Jettons may contain information storage devices. The transmitter-receiver exchange has

- a high-frequency signal generator for simultaneous transmission of time and control signals,
- demodulator,
- modulator,
- control unit,
- systems of uniform connections and signals,
- electronic reading/recording unit,
- several inductive antennas.

The playing card imprint value recognition unit (the said playing cards drawn from the card shoe face down) is created in the form of an optical electronic sensor positioned on the way of the playing card movement, the said optical electronic sensor registers the playing card's imprint value when the playing card is drawn from the card shoe. The said imprint values are always positioned in one and the same definite place. The optical electronic sensor reacts to light of the definite place of

the playing card, coloured or not coloured, and causes switching on the source of light impulses when the imprint value of the playing card is passing over the window of the card shoe. With the help of an optical deflecting device, which is in the form of an optical prism or mirror, the image of the playing card imprint value is transmitted to the CCD image converter.

This known gaming equipment does not facilitate fast game run and does not allow to exercise automatic control over keeping of the game rules at every stage of the game and over the accuracy of dealer's payments of wins to players.

The reason is that the object's presence on the table recognition unit, which is a part of the monitoring system of the game run, contains groups of light-sensitive detectors, which are intended for recognition of object's presence only in the betting boxes and other areas designated for placing jettions on the table. However it does not allow to determine the values of bets made by players. Only presence of bets on the gaming table can be recognized. To determine the number and value of jettions in each placed bet a manual scanner is used in the monitoring system of the game run, the said manual scanner registers the jetton or stack of jettions placed by each player. The image of said jettions is analyzed by number and colour (colour characterizes the jetton's value) and values of bets are determined.

Using such a manual scanner does not allow to exercise control over possible situations related to violation of the game rules, such as adding or removing the jettions or substituting with the jettions of different value during the game run. Scanning of the jettions is executed once and afterwards during the game the control over the bets placed is absent due to the fact that it is impossible to carry out technically. It is possible to provide the control during the game run when using jettions with transponders built into them and transmitter-receiver exchange, but it would require to provide a signal constantly to each jetton, to receive information from each jetton's transponder, to interpret the information received - and only afterwards the information may be transmitted for evaluation to the electronic data processing computer system. Manufacturing of jettions with transponders requires high tangible expenses and transmitter-receiver exchange contains a lot of sophisticated and expensive apparatus.

The known equipment does not allow to exercise control over the dealer's bank and accuracy of payments of wins to the players. Calculation of players wins and transfer of jettons between the dealer's bank and the players takes a lot of time. Game run slows down even more if players place bets on other players' places as well as on their own places. To do this work correctly and quickly the dealer must be highly qualified and have good mathematical skills, however mistakes are common and manifest themselves after the shift end, when the dealer performs the bank count. Also the known gaming equipment does not allow to exercise automatic control over keeping the game rules at every stage of the game and over the accuracy of the dealer's payment of wins to the players in real time.

### **Description of the invention**

The aim of the invention is to develop gaming equipment for table games in which playing cards are used, in particular for the game of "Black Jack" by means of introducing new construction elements, new connections between construction elements and new implementation of the construction elements; such gaming equipment will provide possibility to make the game run faster, to exercise automatic control over keeping of the game rules at every stage of the game and over accuracy of dealer's payments of wins to players.

The stated task is solved in the following way.

Gaming equipment for table games in which playing cards are used, in particular for the game of "Black Jack", including

- gaming table with cloth provided with markings designating playing zones for players and for dealer, as well as areas for placement of playing cards face up,
- card shoe for storage and distribution of playing cards drawn from it face down, the said card shoe is equipped with optical electronic sensor of playing cards' movement and with playing cards imprint value recognition unit (playing cards are drawn from the card shoe),
- monitoring system of the game run, the said monitoring system includes objects presence on the table recognition unit,
- information storage system,

- computer, connected to separate functional units by wire or wireless communications, the said computer is supplied with electronic data processing system programmed in accordance with the gaming rules.

The said electronic data processing system allows to evaluate signals coming

- to the first input of the electronic data processing system from the output of the playing cards imprint value recognition unit (the cards are drawn from the card shoe face down),
- to the second input of the electronic data processing system from the object presence on the table registration unit,
- the third input of the electronic data processing system is connected to the first output of the computer,
- the second output of the computer is connected to the input of the information storage system,
- the first output of the electronic data processing system is connected to the first input of the computer,
- the input of the computer processed data visualisation device (the said data characterize the process of the game run) connected to the third output of the computer.

The innovation is represented in that

- the gaming zone of dealer is additionally supplied with the credit control unit and the players' commands visualisation unit,
- the monitoring system of the game run is additionally supplied with player bet control units and player game control units, positioned in each of the player's gaming zone,
- the outputs of the player bet control units are connected to the fourth input of the electronic data processing system,
- the outputs of the of the game control units are connected to the fifth input of the electronic data processing system,
- the output of the credit control unit is connected to the sixth input of the electronic data processing system,
- the input of the credit control unit is connected to the second output of the electronic data processing system,
- the input of the players' commands visualisation unit is connected to the third output of the electronic data processing system,
- the inputs of the bet control units are connected to the forth output of the electronic data processing system,

- the inputs of the game control units are connected to the fifth output of the electronic data processing system.

The innovation is also represented in that

- credit control unit and players' commands visualisation unit, as well as each player game control unit and each player bet control unit are created in the form of sensory displays,
- each said sensory display contains touchpad, said touchpad has one or more zones for entering commands, and/or liquid-crystal active colour matrix, said matrix has one or more zones for displaying information about the game run,
- the output of each touchpad is connected via corresponding controller to the output of the corresponding unit,
- the input of each liquid-crystal active colour matrix is connected via corresponding controller to the output of the corresponding unit.

The innovation is also represented in that each player bet control unit contains zones for entering commands "credit purchase", "credit sale", "bet", as well as numerical board and zones for displaying information about the game run.

The innovation is also represented in that each player game control unit contains zone for entering operating commands "hit", "split", "double down", "insurance" (yes, no), "stop" as well as zone for displaying information about the game run "win/loss value".

The innovation is also represented in that credit control unit contains zones for entering operating commands, each said zone appears as numerical board and numerical indicator of players' places. "Bet" and "credit" zones for displaying information about the game run are positioned opposite each number indicating a player's place. The said "credit" zone is divided in three parts : "credit value", "purchase", "sale".

The innovation is also represented in that players' commands visualisation unit contains zone for entering operating commands, the said zone appears as numerical indicator of players' places. Zone for

displaying information about the game run is positioned opposite each number indicating a player's place.

The innovation is also represented in that dealer's zone is additionally supplied with optical electronic sensor, the output of the said sensor connected to the seventh input of the electronic data processing system.

Introducing

- player bet control units,
- player game control units,
- credit control unit,
- players' commands visualisation unit,-

in the form of sensory displays, each sensory display containing

- touchpad with two or more zones for entering

operating commands,

- and/or liquid-crystal active colour matrix with one

or several zones for displaying information about the game run,-

facilitates faster game run and provides possibility to exercise automatic control over keeping the game rules and over accuracy of dealer's payments of wins to players.

Due to the fact that the gaming equipment contains player game control units and player bet control units, dealer obtains information about all players' decisions during the game run via zones for entering operating commands. The said zones are positioned on the touchpads of sensory displays, the output of each sensory display connected via corresponding controller to the output of corresponding unit. Sensory displays ensure fast transmission of the information about players' decisions during the game run to the electronic data processing system. The said electronic data processing system provides fast processing of all the incoming data during the game run in accordance with the game rules and transmits the processed information to the computer, the said computer transmits information to the monitoring system of the game run and to the computer processed data visualisation device.

The results of processed data are also displayed in the zones for displaying information about the game run, the said zones are situated on the liquid-crystal active colour matrixes of the sensory displays, the outputs of the said sensory displays are connected via corresponding controllers to the outputs of the corresponding units.

Introducing player bet control units into the monitoring system of the game run, the said player bet control units are presented in the form of sensory displays installed in each player's zone and connected to the electronic data processing system, provides possibility to play games without using jettons. Each player bet control unit has zones for entering operating commands "credit purchase" and "credit sale", numerical board, numerical indicator of player's place as well as zone for displaying information about the game run. When using the known gaming equipment, calculations of players' wins and transfer of jettons between the players' zones and the dealer's bank takes a lot of time. Game run slows down further if players place bets on other players' places as well as on their own places. To do this work correctly and quickly the dealer must be highly qualified and have good mathematical skills. Introducing player bet control units allows to eliminate this shortcoming in the claimed gaming equipment by providing possibility for each player to buy credit from the dealer paying by cash or by jettons. Thus the claimed gaming equipment preserves house's tradition of using jettons as means of exchange, but jettons come to use only when a player begins or ends his/her round of play at the table or purchases additional credit during the round of play. By touching the zone for entering operating command "credit purchase" a player informs dealer about his/her wish to purchase credit and types in desirable credit value using numerical board. Information about credit value is transmitted to the electronic data processing system and then to the computer and to the zones for displaying information about the game run in the player bet control unit and in the dealer's credit control unit. After the credit is bought the player activates operating command "bet" and types in the bet value for the game using numerical board. Each player apart from placing bets on his/her place (active game) can place bets on other players' places (passive game) by typing in appropriate commands using numerical indicator of players' places and numerical board and indicating on which places which value bets he/she is placing.

All information about placed bets (place and value) is transmitted to the electronic data processing system, the fourth input of which is connected to the outputs of the player bet control units. Information about players' bets and the game run, obtained as a result of data processing, is displayed in the player bet control unit zone for displaying information about the game run of the player, the input of the said bet control unit is connected to the fourth output of the

electronic data processing system, thus each player has information about his/her credit value, its increase or decrease during the player's round of play.

When a player wishes to finish his round of play, he/she activates operating command "credit sale", the electronic data processing system transmits information to the dealer's credit control unit zone for displaying information about the game run, instructing the dealer to pay certain amount to the player. The dealer pays the said certain amount to the player in jettons.

Presence of player bet control unit provides possibility of automatic control over the accuracy of dealer's payment of wins to players in real time and also facilitates faster game run. Dealer does not perform calculations, which allows the house to relax requirements to dealer's qualification.

Due to the fact that player game control units presented as sensory displays are introduced in the monitoring system of the game run, the said player game control unit positioned in each player's zone, the outputs of the said player game control units are connected to the fifth input of the electronic data processing system, the outputs of the said player game control units are connected to the fifth output of the electronic data processing system, it becomes possible to speed up the game run and to increase security. Game control units contain zones for entering operating commands "hit", "split", "double down", "insurance"(yes,no), "stop", which allows a player to communicate his/her decisions taken during the game run to the dealer in efficient and straightforward manner.

When the first playing card is distributed, information about the imprint value of the said first card comes to the electronic data processing system. Dealer then distributes the second card and again information about the imprint value about the second card comes to the electronic data processing system. The electronic data processing system adds up values of the two distributed cards. The resulting sum appears in the player game control unit zone for displaying information about the game run and the player makes decision about the next step in the game. Information about the dealer's first card (the said first card the dealer places on the table face up) also appears in the player game control unit zone for displaying information about the game run. If the

value of the dealer's first card is 11 points, player game control unit zone for entering operating command "insurance (yes,no)" comes into active mode, then player bet control unit begins to work again and the player can buy insurance. If the player buys insurance, his/her credit value decreases by the value of the insurance bought. If the player touches the zone of operating command "stop", it means that the player does not wish a third card. If the player wishes a third card, he/she communicates it by touching the zone for entering operating command "hit". If as the result of distribution of the first two cards a player receives two matching cards, say two "tens", he/she may choose to play the game on two hands by touching the zone for entering operating command "split" and placing the bet on the second hand. The electronic data processing system will automatically place bet on the second hand and decrease accordingly the player's credit value.

A player can increase his/her bet or double it by touching the zone for entering operating command "double down". The player bet control unit would become active again and the player can type in the amount by which he/she wishes to double down. The player's credit value again would be decreased accordingly.

One of the known ways of cheating is when a player attempts to decrease (increase) his/her initial bet after realising during the game run, that sequence of cards in the deck is unfavourable (favourable). The gaming equipment known from the prototype retains responsibility for security of the house in such situation with dealers and inspectors. The claimed gaming equipment provides control automatically due to the fact that player bet control unit allows to change bets strictly in accordance with the game rules.

Introducing credit control unit in the claimed gaming equipment, the said credit control unit is presented as a sensory display, the input of which is connected to the second output of the electronic data processing system, provides the possibility for faster game run and improved game security. Credit control unit contains zone for entering operating commands, the said zone contains

- a numerical board,
- numerical indicator of players' places,
- zones "bet" and "credit" positioned opposite each

player's place number, each of the said zones "credit" is divided in three parts: "credit value", "purchase", "sale".

Thus the dealer instantaneously receives information about each player's actions: credit sale, credit purchase, credit value at any moment during the game. Just as quick the dealer receives information about each player's bet for the current game. Dealer does not perform calculations of players' wins or losses and does not move jettons during game process, such actions require significant amount of time. Electronic data processing system provides all calculations, the dealer is supplied with the results of such calculations in the zones for displaying information about the game run. In this way mistakes are eliminated, such mistakes particularly possible in more complicated instances, when a player places bets not only on his/her place, but also on other players' places, plays passive as well as active game.

When using the claimed gaming equipment, provided with the credit control unit, the dealer's duties are limited to handling of cash or jettons when a player purchases credit and informing the electronic data processing unit about the purchased credit value using numerical board of the credit control block. When a player sells the credit, the dealer transfers jettons of corresponding value to the player and reduces the player's credit value accordingly.

Thus it becomes possible to relax requirements to dealers' qualifications.

Introducing players' commands visualisation unit positioned in dealer's zone in the claimed gaming equipment, the said players' commands visualisation unit is presented as a sensory display, the input of which is connected to the third output of the electronic data processing system, promotes faster game run. Players' command visualisation unit contains zone for entering operating commands, the said zone contains

- numerical indicator of the players' places,
- zones for displaying information about the game run, which are positioned opposite each player's place number.

Traditionally players and dealer communicate their decisions during the game by certain gestures, accepted by houses. This requires dealer to watch intensely players' gestures at all time. However in case of an ambiguous gesture dealer may misinterpret it, which leads to mistakes and may halt the game. It takes time to resolve such situations and slows down the game run. Communication by gestures also requires time. As the claimed gaming equipment contains players' commands visualisation unit, dealer receives information about each player's decisions during the game run in the zones for displaying information about the game run.

When the first card is distributed, information about card value of the said card comes to the electronic data processing system. Simultaneously information about the said card value appears in the players' commands visualisation unit zone for displaying information about the game run and in the credit control unit zone for displaying information about the game run. The dealer then distributes second card to the player and again information about the second card value comes to the electronic data processing system. The electronic data processing system adds up the values of the two distributed cards. The resulting sum appears in the players' commands visualisation unit zone for displaying information about the game run and in the credit control unit zone for displaying information about the game run. The player then makes decision about the next step in the game. If the value of the dealer's first card (the said card placed face up) is 11 points and the player makes decision to buy insurance, information about decision made comes to the players' commands visualisation unit zone for displaying information about the game run. If the player does not wish a third card and touches the zone for entering command "stop", this information also comes to the players' commands visualisation unit zone for displaying information about the game run. Also if the player wishes a third card, or to split, or to double down, all such information is transmitted via electronic data processing system to the players' commands visualisation unit zone for displaying information about the game run.

Thus the dealer obtains all information about the players' decisions in the players' commands visualisation unit zone for displaying information about the game run, so the dealer has no need to watch the players' gestures. Due to the fact, that information is first transmitted to the electronic data processing system and then to the monitoring system of the game run, automatic control over keeping the game rules is provided and any situation, that occurred at the table, can be reconstructed at any time if a need arises.

Installing optical electronic sensor in dealer's zone, the output of the said optical electronic sensor is connected to the seventh input of the electronic data processing system, provides possibility to play game using traditional gestures to communicate decisions made during the game. In this situation each player game control unit contains just three zones for entering operating commands - "insurance (yes,no)", "split", "double down", - that is only those commands which

change initially placed bet. Gestures, indicating "hit" or "stop", remain in the game. If a player gestures "stop", dealer switches on the optical electronic sensor and information about the player's decision is transmitted to the electronic data processing system. Until the dealer does not switch on the optical electronic sensor, the electronic data processing system will proceed adding up card values of each following card, placed on the table by the dealer, to the same player.

During the game run the monitoring system of the game run, made as optical electronic device for processing images of the objects present on the gaming table, monitors all actions of the dealer and the players and passes this information to the electronic data processing system. Thus the claimed gaming equipment ensures achievement of the aim of the invention - significantly faster pace of game and providing automatic control over keeping the game rules at each stage of the game and over accuracy of dealer's payments of wins to players.

#### **Brief description of drawings**

The nature of the invention is explained with drawings. In fig.1 the gaming table is shown in general form, in fig.2 - player bet control unit in general form, in fig.3 - player game control unit in general form, in fig.4 - credit control unit in general form, in fig.5 - players' commands visualisation unit in general form, in fig .6 - module diagram of the gaming equipment.

The gaming equipment for table games in which playing cards are used, in particular for the game of "Black Jack", contains

- a gaming table 1 with a cloth 2, the said cloth is provided with markings designating players' sectors 3, dealer's sector 4 and other sections for placing playing cards face up,

- card shoe 6 for storage and distribution of playing cards drawn from it face down, the said card shoe 6 is equipped with optical electronic sensor 7 of movement of playing cards and also with playing card imprint value recognition unit 8 for recognition of playing cards drawn from card shoe,

- monitoring system of the game run 9, equipped with
- objects' presence on the table recognition unit

10,

- player bet control units 11, positioned in each

player's sector 3,

- player game control units 12, positioned in each

player's sector 3,

- credit control unit 13, positioned in dealer's

sector 4,

- players' commands visualisation unit 14,

positioned in dealer's sector 4;

- information storage system 15,
- computer 16, connected to separate functional

units by means of wire or wireless communications, the said computer 16 is supplied with electronic data processing system 17, programmed in accordance with the game rules.

Each player bet control unit 11 is presented as a sensory display, containing touch sensitive panel and/or liquid-crystal active colour matrix, the output of the said touch sensitive panel of each player bet control unit 11 is connected via corresponding controller (not shown in the drawings) to the output of the corresponding player bet control unit 11, the input of the said liquid crystal active colour matrix of each player bet control unit 11 is connected via controller (not shown in the drawings) to the input of the corresponding player bet control unit 11.

Each touch sensitive panel of player bet control unit 11 contains the following zones for entering operating commands: zone 18 - "credit purchase", zone 19 - "credit sale", zone 20 - "bet", numerical board 21, numerical indicator of players' places 22. Each liquid-crystal active colour matrix of player bet control unit 11 contains zone 23 for displaying information about the game run. Each player game control unit 12 is presented as a sensory display, containing touch sensitive panel and/or liquid-crystal active colour matrix, the output of the said touch sensitive panel of each player game control unit 12 is connected via corresponding controller (not shown in the drawings) to the output of corresponding player game control unit 12, the input of the said liquid-crystal active colour matrix of each player game control unit 12 is connected via controller (not shown in the drawings) to the input of corresponding player game control unit 12.

Each liquid-crystal active colour matrix of player game control unit 12 contains zone 24 for displaying information about the game run.

Each touch sensitive panel of player game control unit 12 contains the following zones for entering operating commands: zone 25 - "hit", zone 26 - "split", zone 27 - "double down", zone 28 - "insurance (yes,no)", zone 29 - "stop".

Dealer's sector is equipped with optical electronic sensor 30.

Credit control unit 13 is presented as a sensory display, containing touch sensitive panel and/or liquid-crystal active colour matrix, the output of the said touch sensitive panel of credit control unit 13 is connected via controller (not shown in the drawings) to the output of credit control unit 13, the input of the said liquid crystal active colour matrix of credit control unit 13 is connected via controller (not shown in the drawings) to the input of credit control unit 13.

Touch sensitive panel of credit control unit 13 contains zone for entering operating commands, the said zone appears as numerical indicator 31 of players' places from 1<sup>st</sup> to 7<sup>th</sup>. Opposite each player's place number on the liquid-crystal active colour matrix of credit control unit 13 the following zones for displaying information about the game run are situated: zone 32 - "credit", zone 36 - "bet". Zone 32 "credit" is divided in three parts: first part 33 - "credit value", second part 34 - "credit purchase", third part 35 - "credit sale".

Touch sensitive panel of credit control unit 13 contains also zone for entering operating commands, which appears as numerical board 37.

Players' commands visualisation unit 14 is presented as a sensory display, containing touch sensitive panel and/or liquid-crystal active colour matrix, the output of the said touch sensitive panel of players' commands visualisation unit 14 is connected via controller (not shown in the drawings) to the output of players' commands visualisation unit 14, the input of liquid-crystal active colour matrix of players' commands visualisation unit 14 is connected via controller (not shown in the drawings) to the input players' commands visualisation unit 14.

Touch sensitive panel of players' commands visualisation unit 14 contains zone for entering operating commands, the said zone appears as numerical indicator 38 of players' places from 1<sup>st</sup> to 7<sup>th</sup>.

Zones 39 for displaying information about the game run are situated opposite each player's place number on the liquid-crystal active colour matrix of players' commands visualisation unit 14.

The gaming equipment contains also computer processed data visualisation device 40 for visualisation of data, processed by computer 16, the said data characterize the game run.

The first input of electronic data processing system 17 is connected to the output of playing card imprint value recognition unit 8 (playing cards are drawn from card shoe 6 face down), the second input of electronic data processing system 17 is connected to the input of objects presence on the table recognition unit 10, the third input of electronic data processing system 17 is connected to the first output of computer 16, the first output of electronic data processing system 17 is connected to the first input of computer 16, the second output of computer 16 is connected to the input of information storage system 15.

The input of computer processed data visualisation device 40 for visualisation of data, processed by computer 16 (the said data characterize the game run), is connected to the third output of computer 16, the outputs of player bet control units 11 are connected to the fourth input of electronic data processing system 17, the outputs of player game control units 12 are connected to the fifth input of electronic data processing system 17, the output of credit control unit 13 is connected to the sixth input of electronic data processing system 17, the input of credit control unit 13 is connected to the second output of electronic data processing system 17, the input of players' commands visualisation unit 14 is connected to the third output of electronic data processing system 17, the inputs of player bet control units 11 are connected to the fourth output of electronic data processing system 17, the inputs of player game control units 12 are connected to the fifth output of the electronic data processing system 17, the output of optical electronic sensor 30 is connected to the seventh input of electronic data processing system 17.

### The best variant of invention implementation

Gaming equipment for table games in which playing cards are used, in particular for the game of "Black Jack" operates in the following way. Before the beginning of the game the dealer thoroughly shuffles the playing cards, it is advisable to use a device for this purpose, then the dealer places the cards face down in the card shoe 6. Each player at the gaming table 1, covered with cloth 2, purchases credit using situated in every playing sector 3 player bet control unit 11, presented as a sensory display. A player activates operating command "credit purchase" by touching zone 18 and passes his/her cash/jettons over to the dealer. Second part of zone 32 "purchase" and numerical board, which are situated in the credit control unit 13, become activated. Using numerical board 37 of credit control unit 13, the dealer types in credit value and sends it to the electronic data processing system 17 by touching appropriate zone on numerical indicator of players' places 31. Information about the player's credit value appears in zone 23 for displaying information about the game run of player bet control unit 11, situated in that player's sector. Numerical boards 21 and numerical indicators 22 become activated. Next players place their bets for the game, for which each player types in the bet value, using numerical board 21 of the player bet control unit 11, and touches zone 20 "bet". Electronic data processing system 17 decreases credit value of each player by the amount of corresponding bet value. Electronic data processing system 17 transmits information about bet, made by each player, to the second part 33 "credit value" of zone 32 "credit" for displaying information about the game run and to zone 36 "bet" of credit control unit 13. Next the dealer begins to distribute one playing card to each player from right to left and one playing card to him/herself. When a playing card's edge crosses working field of optical electronic sensor 7 of movement of playing cards, it activates playing card imprint value recognition unit 8 (the said card is drawn from card shoe 6 face down). After the said playing card has arrived on the table, objects' presence on the table recognition unit 10 of the monitoring system of the game run 9 recognizes the card's imprint value. Information about the image of playing card (the said playing card comes to the section 5 for placing cards face up and is intended for a

particular player) is transmitted via electronic data processing system 17 of computer 16 to players' commands visualisation unit 14, presented as a sensory display. Electronic data processing system 17 also receives information from objects' presence on the table recognition unit 10 of monitoring system of the game run 9 about imprint value of the playing card which has arrived to the section 5 for placing cards face up on the gaming table. In the same manner first playing card is distributed to each consecutive player and to the dealer. First card for the dealer is placed on the table face up.

Next the dealer distributes second card to each player, starting from the first player on the right, and to him/herself, dealer's second card is placed on the table face down.

Information about the image of second playing card (the said playing card comes to the section 5 for placing cards face up and is intended for a particular player) is transmitted via electronic data processing system 17 of computer 16 to players' commands visualisation unit 14. Electronic data processing unit 17 adds up values of two distributed cards and each player receives information about his/her resulting sum in zone 24 "total value" for displaying information about the game run of sensory display of player game control unit 12.

Having been distributed two playing cards, a player makes decision about the next step in the game. A player can double the bet, request hit or, having received two, say, tens, split and place the same bet on the second deck or double the first bet.

If the value of dealer's first card is 11 points, zone 28 "insurance (yes,no)" of game control unit 12 becomes activated and a player can buy insurance.

A player communicates his/her decision by touching an appropriate zone of player game control unit: zone 25 - "hit", zone 26 - "split", zone 27 - "double down", zone 28 - "insurance (yes,no)". If a player does not wish hit, he/she informs about it by touching zone 29 - "stop". If insurance is bought, the bet usually equals half of initial bet and a player buys insurance to insure the initial bet in case of the dealer's win. If dealer wins, that is to say the dealer has "Black Jack" - 21 points, the player wins double insurance bet. If dealer does not get 21 points, the player loses the insurance bet, but plays the normal game with the initial bet. If a player decides to buy insurance, split or

double down, player bet control unit 11 becomes activated and the player enters the value of additional bet by using numerical board 21 of player bet control unit 11. Information about the player's decision comes to electronic data processing system 17. From electronic data processing system 17 information about the player's decision is passed to the dealer to zone 39 for displaying information about the game run. Two players can play at the same playing place, one of them or both at the same time can do all described above manipulations with playing cards and bets. Any player at the table can also play passive game, that is to say place bets not only at his/her playing place, but also on others. In order to do this, players, using numerical indicators of players' places 22, show where do they wish to put their bets and, using numerical boards 21 of player bet control units 11, enter bets' values.

Dealer plays with each player in turn. Dealer can start to play with the next player only after the results of calculations, performed by electronic data processing system 17 for the previous player, have been displayed in zone 23 for displaying information about the game run and in zone 32 "credit" of credit control unit 13. If a player wishes to finish his/her game after the end of a game round, he/she touches zone 19 "credit sale" of player bet control unit 11. Electronic data processing system 17 performs final calculations and produces information about size of payment due to the player.

All information about the values of dealer's and players' playing cards, bets and the game run, which comes to electronic data processing system 17 of computer 16, is displayed in computer processed data visualisation device 40.

Also information, which comes to electronic data processing system 17 from objects' presence on the table recognition system 10 of monitoring system of the game run 9, from player bet control units 11 and player game control units 12 is transmitted to information storage system 15. If a need arises information storage system 15 can provide any data about each stage of the game or about the game in whole.

As seen from above, the claimed gaming equipment provides faster game run and automatic control over keeping the game rules at each stage of the game and over accuracy of dealer's payments of wins to players. The claimed equipment allows to liberate dealer from performing calculations

and watching the players' gestures during the game run, so it becomes possible to relax requirements to dealer's qualifications.

However if a house prefers to preserve wholly or at some of the gaming tables the game of "Black Jack" with players using traditional gestures to communicate their decisions, player game control units 12 can be provided with just three zones for entering operating commands - "insurance (yes,no)", "split", "double down",- that is the zones, related to change of initial bets. In this case gestures, indicating "hit" or "stop", remain in the game. If a player gestures "stop", dealer switches on the optical electronic sensor 30 and information about it is transmitted to the electronic data processing system 17. Until the dealer does not switch on the optical electronic sensor 30, the electronic data processing system 17 will proceed adding up card values of each following card, placed on the table by the dealer, to the same player. Thus the claimed gaming equipment ensures high level of technical control, prevents violation of game rules and improves security of the house.

### **Industrial application**

In the claimed gaming equipment for table games in which playing cards are used, in particular for the game of "Black Jack"

- gaming table 1 with cloth 2 provided with markings, designating sectors 3 for players and dealer's sector, as well as sections 5 for placing playing cards face up,
- card shoe 6, provided with optical electronic sensor 7 of movement of playing cards,
- playing card imprint value recognition unit 8, cards are drawn from card shoe 6 face down,
- objects' presence on the table recognition unit 10 of the monitoring system of the game run 9,-

are created in the same way as in the gaming equipment known from the prototype or with use of any other standard gaming tables, card shoes and means for recognition of imprint values of playing cards, drawn from a card shoe face down, known in this technical field, and means of objects' presence on the table recognition known in this technical field.

Player bet control units 11 and player game control units 12, installed in each player's sector 3, as well as credit control unit 13 and players' commands visualisation unit 14, installed in dealer's sector, can be created as sensory displays. Each sensory display comprises, for instance, liquid-crystal active colour matrix, created on the basis of thin film transistors (TFT), and special touch sensitive panel. Use of liquid-crystal active colour matrix ensures best trade-off between quality and price as compared with displays, created on base of passive matrix (STN and DSTN). Realisation of such system is possible by using liquid-crystal active colour matrix, for instance UB104S01 COLOR TFT-LCD, manufactured by UNIPAC OPTOELECTRONICS CORPORATION (Taiwan). Such active matrix has convenient size (10.4 inches diagonal), is characterised by fairly high resolution (800x600 pixels) and brightness and supports transmission of 262,144 colours. Required brightness of image glow, obtained on the matrix, is provided by built in cold cathode illumination lamp (CCFT), powered by inverter, for instance QF38V6.57 manufactured by company WINMATE (Taiwan). Active matrix has links with control board on the base of microprocessor ROBO-603 on interface LVDS providing data transmission for image forming. Touch sensitive panel for entering operating commands can be realised, for instance, on the basis of touch screen panel like A01-104AC402B manufactured by company CHILIN TECHNOLOGY (Taiwan). The said panel is created as a multilayer film construction made of tin and indium. Such panel provides low absorption of luminous flux from active matrix and is characterized by high mechanical durability to touch (100,000 times and more if touched with the tip of a ball-pen). Information about the point of touch is transmitted to control circuit by means of creating certain potential difference with four-wire method. Processing and translating information about the point of touch into a control code for further processing in control circuit is carried out by a controller, for example, such as PM1102R, manufactured by the company WINMATE (Taiwan) (see Review of liquid-crystal display technologies. Scientific and technical magazine "Computer review", No11, 22-28 March 2000).

Computer 16 provides interaction of all the functional units and can be implemented as a single-board computer ROBO-603 with two USB-ports, one of which provides connection to the electronic data processing system 17. Via this port change of software, stipulating the game rules, can also be carried out. Information about the computer can be found in

scientific and technical magazine "Electronic components and systems", Kiev, SPF VD MAIS, No.9, 2002, p.26.

Electronic data processing system 17 can be implemented on the base of single-board computer NC-6060 (see Single-board computer NC-6060 of the company Portwell. Scientific and technical magazine "Electronic components and systems", Kiev, SPF VD MAIS, No.9, 2002, p.36).

Information storage system 15 and computer processed data visualisation device 40 for visualisation of data, processed by computer 16, can be implemented in the same way as in the gaming equipment known from the prototype.